SILENTSYS
ultralow noise systems

OPTICAL FREQUENCY CORRELATOR

Ultralow frequency noise
Compact & turn-key
UV-VIS-NIR-MIR

Datasheet rev. 1607C

OFC

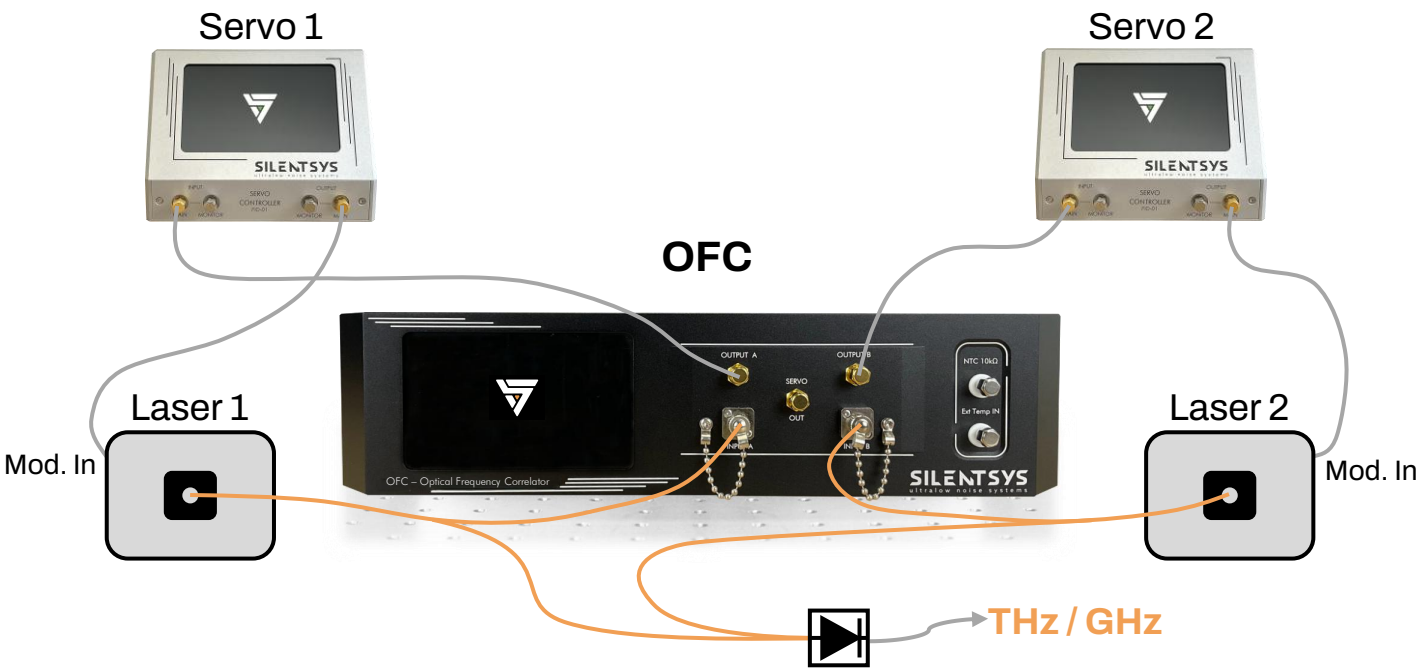
OPTICAL FREQUENCY CORRELATOR

The OFC system is comprised of a common 2-input optical frequency discriminator (OFD). This makes it possible to frequency-stabilize two wavelength-distant lasers onto the same optical reference to reduce their frequency fluctuations and to correlate them.

Based on this fact, the optical beat frequency between the two stabilized lasers generates a THz or GHz signal that reaches a very low frequency noise level and high frequency stability.

Moreover, as a standard OFD, it smartly delivers a voltage signal that is proportional to the frequency fluctuations of the input laser beam. This turn-key device is suitable for laser frequency noise characterization and/or for laser frequency stabilization to drastically reduce its optical full-width-at-half-maximum linewidth. The OFC features ultralow noise performances, achieving frequency noise levels as low as 0.01 Hz^2/Hz, in a compact and user-friendly package. It also includes external temperature control to act on the laser frequency once it is locked onto the OFC.

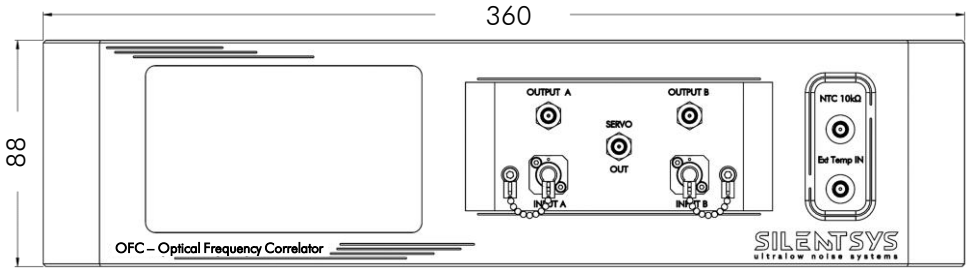
HOW-TO-USE



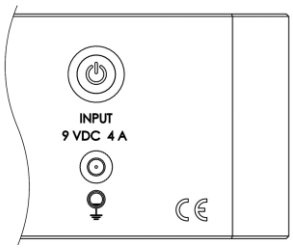
Products

DRAWINGS

FRONT VIEW



BACK VIEW (cropped)



SPECIFICATIONS

- Number of optical inputs: 2
- Optical input connector: FC/APC
- Laser type: Single-frequency continuous wave
- Optical input power: typ. 200 µW before saturation (measured at 1.5 µm)

- Number of electrical outputs: 2
- Electrical output connector: SMA
- Electrical output voltage range: ±3 V max

- Free Spectral Range (FSR): typ. 1 MHz to 1 GHz
- System sensitivity: typ. 1 MHz/V to 1 GHz/V
- Frequency noise floor limit: typ. < 0.01 Hz2/Hz
- Typical laser linewidth achievable: down to Hz-level

- External temperature control
- NTC resistance reading connector: SMA
- Temperature control input connector: SMA

- Product dimensions: 360 x 360 x 88 mm3
- Product weight: approx. 8.2 kg
- Aluminum case
- Temperature: +10 °C to +40 °C

Products

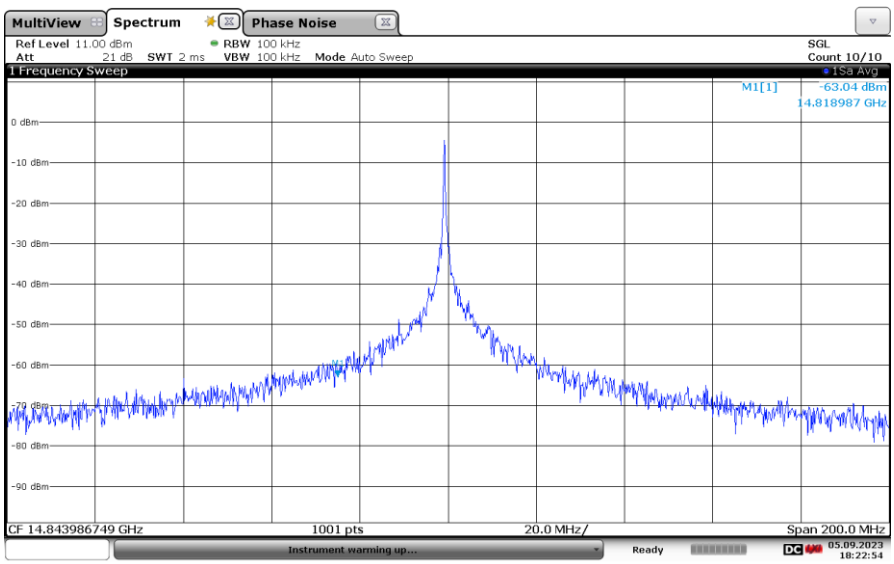
TYPICAL PERFORMANCES

Here are typical results of a beat note measured at ~14.5 GHz, when lasers are free-running and locked.

The two lasers are emitting at telecom wavelength and are semiconductor DFB lasers.

The optical beat note has been detected on a fast photodiode and analyzed with Signal Source Analyzer FSWP-26 from Rohde & Schwarz.

Free-running



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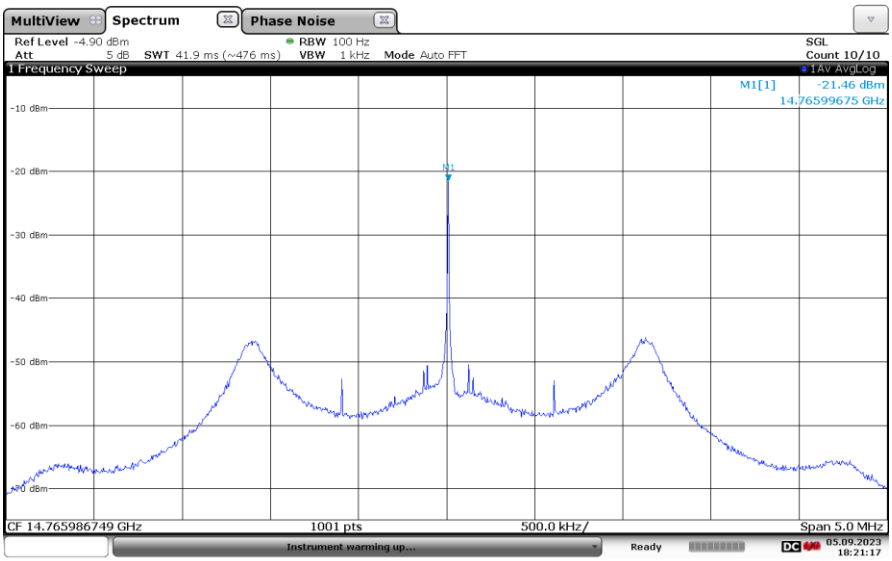

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Locked